L Number	Hits	Search Text	DB	Time stamp
1	15	429/12-46.ccls. and ((scandia or Sc) same mol$1)	USPAT; US-PGPUB	2003/10/30 19:23
2	12	429/12-46.ccls. and (scandia same mol$1)	USPAT; US-PGPUB	2003/10/30 19:23
3	3	(429/12-46.ccls. and ((scandia or Sc) same mol$1)) not (429/12-46.ccls. and (scandia same mol$1))	USPAT; US-PGPUB	2003/10/30 19:23
-	319	ukai.in.	USPAT; US-PGPUB	2003/10/29 19:06
-	1627	mizutani.in.	USPAT; US-PGPUB	2003/10/29 19:07
-	1944	ukai.in. or mizutani.in.	USPAT; US-PGPUB	2003/10/29 19:07
-	9	(ukai.in. or mizutani.in.) and 429/12-46.ccls.	USPAT; US-PGPUB	2003/10/30 10:40
-	1634	429/30,40.ccls.	USPAT; US-PGPUB	2003/10/30 10:41
-	1625	429/33,41,44.ccls.	USPAT; US-PGPUB	2003/10/30 10:41
-	378	429/30,40.ccls. and (solid adj oxide)	USPAT; US-PGPUB	2003/10/30 10:45
-	4	(("5399184") or ("5958616") or ("6485855") or ("6630263")).PN.	USPAT	2003/10/30 10:45
-	0	((("5399184") or ("5958616") or ("6485855") or ("6630263")).PN.) and (solid adj oxide)	USPAT	2003/10/30 10:46
-	228	(429/30,40.ccls. and (solid adj oxide)) and (zirconia or yttria)	USPAT	2003/10/30 10:54
-	200	(429/30,40.ccls. and (solid adj oxide)) and (yttria)	USPAT	2003/10/30 10:55
-	201	(429/30,40.ccls. and (solid adj oxide)) and (yttria or scandia)	USPAT	2003/10/30 10:55
-	267	(429/30,40.ccls. and (solid adj oxide)) and (yttria or scandia)	USPAT; US-PGPUB	2003/10/30 11:59
-	2629	429/30,40.ccls. or 429/33,41,44.ccls.	USPAT; US-PGPUB	2003/10/30 11:59
-	35	(429/30,40.ccls. or 429/33,41,44.ccls.) and (bend$3 adj strength)	USPAT; US-PGPUB	2003/10/30 13:27
-	359	(429/30,40.ccls. or 429/33,41,44.ccls.) and (mechanical adj strength)	USPAT; US-PGPUB	2003/10/30 14:11
-	1	"6428920"	USPAT; US-PGPUB	2003/10/30 13:27
-	156	(429/30,40.ccls. or 429/33,41,44.ccls.) and (mechanical adj strength) and mol	USPAT; US-PGPUB	2003/10/30 13:29
-	170	(429/30,40.ccls. or 429/33,41,44.ccls.) and (mechanical adj strength) and mol$1	USPAT; US-PGPUB	2003/10/30 13:29
-	6900	429/12-46.ccls.	USPAT; US-PGPUB	2003/10/30 14:11
-	50	429/12-46.ccls. and (mol$1 same (nickel or Ni) same (yttria or scandia))	USPAT; US-PGPUB	2003/10/30 17:08
-	22	429/12-46.ccls. and (mol$1 same (cobalt or Co or ruthenium or Ru) same (yttria or scandia))	USPAT; US-PGPUB	2003/10/30 16:52
-	2	(fuel adj cell) and (mol$1 same (nickel or Ni) same (yttria or scandia))	EPO; JPO	2003/10/30 16:52
-	0	(fuel adj cell) and (mol$1 same (cobalt or Co or ruthenium or Ru) same (yttria or scandia))	EPO; JPO	2003/10/30 17:03
-	1	"02002878"	DERWENT	2003/10/30 17:03
-	1	"02002878"	JPO	2003/10/30 17:03
-	115	429/12-46.ccls. and (scandia)	USPAT; US-PGPUB	2003/10/30 17:09
-	0	429/12-46.ccls. and (scandia same yytria)	USPAT; US-PGPUB	2003/10/30 17:09
-	94	429/12-46.ccls. and (scandia same yttria)	USPAT; US-PGPUB	2003/10/30 17:09
-	59	429/12-46.ccls. and (scandia same yttria) and mol$1	USPAT; US-PGPUB	2003/10/30 17:10
-	12	429/12-46.ccls. and (scandia same mol$1)	USPAT; US-PGPUB	2003/10/30 19:23
-	9	"5261944"	USPAT; US-PGPUB	2003/10/30 17:36

-	1	6428920.pn. and interfacial	USPAT; US-PGPUB	2003/10/30 17:42
-	6	"5908713"	USPAT; US-PGPUB	2003/10/30 17:42

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FILE 'HOME' ENTERED AT 16:52:43 ON 30 OCT 2003

=> file caplus
COST IN U.S. DOLLARS                              SINCE FILE      TOTAL
                                                       ENTRY    SESSION
FULL ESTIMATED COST                                     0.21       0.21

FILE 'CAPLUS' ENTERED AT 16:52:51 ON 30 OCT 2003
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FILE COVERS 1907 - 30 Oct 2003  VOL 139 ISS 18
FILE LAST UPDATED: 29 Oct 2003  (20031029/ED)

  This file contains CAS Registry Numbers for easy and accurate
  substance identification.


=> s (fuel adj cell) and (mol1 same (cobalt or Co or ruthenium or Ru) same (yttria
or scandia))
1 IS NOT A RECOGNIZED COMMAND
The previous command name entered was not recognized by the system.
For a list of commands available to you in the current file, enter
"HELP COMMANDS" at an arrow prompt (=>).

=> s (fuel cell) and (mol (p) (cobalt or Co or ruthenium or Ru) (p) (yttria or
scandia))
        322163 FUEL
       1706529 CELL
         36003 FUEL CELL
                 (FUEL(W)CELL)
       2036663 MOL
        326212 COBALT
        739209 CO
         75379 RUTHENIUM
         57274 RU
         24781 YTTRIA
           447 SCANDIA
            82 MOL (P) (COBALT OR CO OR RUTHENIUM OR RU) (P) (YTTRIA OR SCANDIA
               )
L1          22 (FUEL CELL) AND (MOL (P) (COBALT OR CO OR RUTHENIUM OR RU) (P)
               (YTTRIA OR SCANDIA))

=> d l1 1-22 ibib kwic ab

L1   ANSWER 1 OF 22  CAPLUS  COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER:        2002:936920  CAPLUS
DOCUMENT NUMBER:         138:290334
TITLE:                   Electrochemical properties of reduced-temperature
                         SOFCs with mixed ionic-electronic conductors in
                         electrodes and/or interlayers
```

AUTHOR(S): Matsuzaki, Yoshio; Yasuda, Isamu
CORPORATE SOURCE: Fundamental Technology Laboratory, Tokyo Gas Co. Ltd., Tokyo, Minato, 105-0023, Japan
SOURCE: Solid State Ionics (2002), 152-153, 463-468
CODEN: SSIOD3; ISSN: 0167-2738
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB . . . were fired onto both surfaces of the electrolyte of 0.2-mm thickness at 1523 K, before firing the Ni-Sm0.1Ce0.9O1.95-(CeO2)0.1[(Y2O3)0.08(ZrO2)0.92]0.9 (Ni-SDC-CeYSZ) (10 **mol%** ceria-doped **yttria**-stabilized zirconia [YSZ]) cermet anode at 1723 K and La0.7Sr0.3Co0.2Fe0.8O3-Sm0.2Ce0.8O1.9 (LSCF-SDC) composite cathode at 1373 K. The cells have a nominal. . . time of 1000 h. Anode-supported cells with a thin YSZ electrolyte film approx. 30 .mu.m thick were also prepd. by **co**-sintering of screen-printed YSZ paste on a compacted anode substrate. The cells have a nominal size of 50.times.50 mm2 with an. . .

ST lanthanum gallium trioxide electrolyte solid oxide **fuel cell**; cerium yttrium stabilized zirconia anode **fuel cell**; samarium doped ceria anode solid oxide **fuel cell**; strontium lanthanum cobalt iron oxide cathode **fuel cell**

IT Electric conductivity
Electric current-potential relationship
Fuel cell anodes
Fuel cell cathodes
Fuel cell electrolytes
Ionic conductivity
Solid state fuel cells
(electrochem. properties of reduced-temp. solid-oxide fuel cells with mixed ionic-electronic conductors in electrodes and/or interlayers)

IT 117655-29-5, Cerium samarium oxide Ce0.9Sm0.1O1.95 158985-67-2, Cerium yttrium zirconium oxide Ce0.1Y0.14Zr0.83O2.07
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(**fuel cell** anode component; electrochem. properties of reduced-temp. solid-oxide fuel cells with mixed ionic-electronic conductors in electrodes and/or interlayers)

IT 116875-84-4, Cerium samarium oxide Ce0.8Sm0.2O1.9 119883-91-9, Cobalt iron lanthanum strontium oxide Co0.2Fe0.8La0.7Sr0.3O3
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(**fuel cell** cathode component; electrochem. properties of reduced-temp. solid-oxide fuel cells with mixed ionic-electronic conductors in electrodes and/or interlayers)

IT 400716-50-9, Gallium lanthanum magnesium strontium oxide Ga0.8La0.9Mg0.2Sr0.1O2.8
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(**fuel cell** electrolyte; electrochem. properties of reduced-temp. solid-oxide fuel cells with mixed ionic-electronic conductors in electrodes and/or interlayers)

AB We have investigated the electrochem. properties of two types of reduced-temp. solid oxide fuel cells (SOFCs) in which the mixed ionic-electronic conductors are used to improve their performances. Electrolyte-supported cells, in which doped LaGaO3 strengthened by Al2O3 dispersion is used as the electrolyte, were prepd. and tested. Samaria-doped ceria (SDC) interlayers of 0.3-.mu.m thickness were fired onto both surfaces of the electrolyte of 0.2-mm thickness at 1523 K, before firing the Ni-Sm0.1Ce0.9O1.95-(CeO2)0.1[(Y2O3)0.08(ZrO2)0.92]0.9

(Ni-SDC-CeYSZ) (10 **mol%** ceria-doped **yttria**-stabilized zirconia [YSZ]) cermet anode at 1723 K and La0.7Sr0.3Co0.2Fe0.8O3-Sm0.2Ce0.8O1.9 (LSCF-SDC) composite cathode at 1373 K. The cells have a nominal size of 60.times.60 mm2 with an effective electrode area of 4 cm2. The single cell thus prepd. showed a high power d. of 0.67 W cm-2 at 1073 K and long-term stability during the operation time of 1000 h. Anode-supported cells with a thin YSZ electrolyte film approx. 30 .mu.m thick were also prepd. by **co**-sintering of screen-printed YSZ paste on a compacted anode substrate. The cells have a nominal size of 50.times.50 mm2 with an effective electrode area of 4 cm2. The single cell with the LSCF-SDC composite cathode having SDC interlayer showed the max. power d. of 0.648 W cm-2 at 1023 K. The bilayer cathode also showed high resistance against degrdn. by Cr-poisoning.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 2 OF 22 CAPLUS

ACCESSION NUMBER: 2002:829542 CAPLUS
DOCUMENT NUMBER: 138:59982
TITLE: Formation of secondary phases at the interface between strontium-doped lanthanum manganite and yttria-stabilized zirconia
AUTHOR(S): Yang, Chih-Chung T.; Wei, Wen-Cheng J.; Roosen, Andreas; Buchkremer, H. P.
CORPORATE SOURCE: Department of Materials Science and Engineering, National Taiwan University, Taipei, Taiwan
SOURCE: Ceramic Engineering and Science Proceedings (2002), 23(3), 733-740
CODEN: CESPDK; ISSN: 0196-6219
PUBLISHER: American Ceramic Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB . . . at the interface between zirconia electrolytes and Sr-doped Lanthanum Manganite in planar Solid Oxide Fuel Cells (SOFCs) was investigated. Zirconia-8 **mol% Yttria** (YSZ) electrolyte was fabricated by tape casting and coated with the cathode material La0.65Sr0.30MnO3 (LSM) by screen-printing. The structures were **co**-fired under different conditions. The sintered specimens were annealed at 1000.degree.C for various periods. The formation of secondary phases and interdiffusion. . .

IT **Fuel cell** cathodes
(lanthanum strontium manganite; lanthanum strontium manganite cathode interface reaction with yttria-stabilized zirconia electrolyte in relation to performance in solid oxide fuel cells)

AB The formation of secondary phases at the interface between zirconia electrolytes and Sr-doped Lanthanum Manganite in planar Solid Oxide Fuel Cells (SOFCs) was investigated. Zirconia-8 **mol% Yttria** (YSZ) electrolyte was fabricated by tape casting and coated with the cathode material La0.65Sr0.30MnO3 (LSM) by screen-printing. The structures were **co**-fired under different conditions. The sintered specimens were annealed at 1000.degree.C for various periods. The formation of secondary phases and interdiffusion effects at the interface of these samples were studied by X-ray diffractometry (XRD), SEM and TEM equipped with energy-dispersive spectroscopy (EDS). The results of the formation of secondary phases and diffusion effects are discussed with regard to the processing conditions.

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 3 OF 22 CAPLUS

ACCESSION NUMBER: 2002:459074 CAPLUS
DOCUMENT NUMBER: 137:327336
TITLE: Fracture energy and crack growth in surface treated yttria stabilized zirconia for SOFC applications

AUTHOR(S): Kumar, Amar N.; Sorensen, Bent F.
CORPORATE SOURCE: Department of Applied Mechanics, Indian Institute of Technology, Hauz-Khas, New Delhi, 110 016, India
SOURCE: Materials Science & Engineering, A: Structural Materials: Properties, Microstructure and Processing (2002), A333(1-2), 380-389
CODEN: MSAPE3; ISSN: 0921-5093
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The solid oxide **fuel cell** (SOFC) electrolyte, 8 **mol%** cubic phase **yttria** stabilized zirconia (YSZ), is coated and **co**-sintered with different electrode coatings. The fracture toughness and stable crack growth behavior of the treated YSZ are investigated and compared. . . .

ST solid oxide **fuel cell** surface treated yttria stabilized zirconia

AB The solid oxide **fuel cell** (SOFC) electrolyte, 8 **mol%** cubic phase **yttria** stabilized zirconia (YSZ), is coated and **co**-sintered with different electrode coatings. The fracture toughness and stable crack growth behavior of the treated YSZ are investigated and compared with that of pure YSZ. Two energy release rate (G) values, corresponding to crack initiation (Gi) and crack arrest (Ga) are used to characterize the cracking behavior. An improvement in the fracture resistance behavior by around 30-50% as compared with untreated YSZ is obsd. due to coating effects. Crack growth rate, da/dt, as a function of applied G is represented by a power law of the form da/dt=A (G)n, where A and n are the fitting consts. Interdiffusion of both Mn and Ni from coatings into the YSZ lattice during sintering appears to introduce residual stresses leading to an improvement in the fracture energy. The cracking mode for all the surface treated ceramics is identified to be predominantly transgranular in nature. Crack bridging appears to contribute for improved fracture toughness values in surface treated YSZ.

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 4 OF 22 CAPLUS
ACCESSION NUMBER: 2000:880174 CAPLUS
DOCUMENT NUMBER: 134:19326
TITLE: Regenerative solid oxide fuel cells for Mars exploration
AUTHOR(S): Sridhar, K. R.; Foerstner, R.
CORPORATE SOURCE: University of Arizona, Tucson, AZ, 85719, USA
SOURCE: Journal of Propulsion and Power (2000), 16(6), 1105-1111
CODEN: JPPOEL; ISSN: 0748-4658
PUBLISHER: American Institute of Aeronautics and Astronautics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB A regenerative solid oxide **fuel cell** was designed, built, and tested for Mars exploration. The **fuel cell** operates at night on **CO** and excess O2 generated during the day from the Mars atm. CO2. The primary objective of the device was to. . . generate O2 from the Mars atm. for use as an ascent vehicle propellant. The cells tested were composed of an 8-**mol% yttria** -stabilized zirconia electrolyte and two platinum electrodes. The results obtained from the exptl. tests were consistent with the theor. relations predicted by thermodn. and electrochem. The performance loss of the **fuel cell**, obsd. during the first 40 h of operation in the **fuel cell** mode, was attributed to chemisorption of **CO** by the platinum electrodes. It was found that the concn. overpotential was negligible and the calcd. activation overpotential fit well. . . .

ST solid oxide **fuel cell** regenerative Mars
AB A regenerative solid oxide **fuel cell** was designed, built, and tested for Mars exploration. The **fuel cell** operates at night on **CO** and excess O2 generated during the day from the Mars atm. CO2. The primary objective of the device was to generate O2 from the Mars atm. for use as an ascent vehicle propellant. The cells tested were composed of an 8-**mol% yttria** -stabilized zirconia electrolyte and two platinum electrodes. The results obtained from the exptl. tests were consistent with the theor. relations predicted by thermodn. and electrochem. The performance loss of the **fuel cell**, obsd. during the first 40 h of operation in the **fuel cell** mode, was attributed to chemisorption of **CO** by the platinum electrodes. It was found that the concn. overpotential was negligible and the calcd. activation overpotential fit well with the Tafel equation. The results suggest that operating O2 generator cells as fuel cells with low fuel utilization at night has advantages for Mars missions.
REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 5 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 2000:718469 CAPLUS
DOCUMENT NUMBER: 133:364383
TITLE: Perovskite oxides for the cathode in solid oxide fuel cells
AUTHOR(S): Takeda, Yasuo; Sakaki, Yoshinori; Tu, Heng Young; Phillipps, Michael Brian; Imanishi, Nobuyuki; Yamamoto, Osamu
CORPORATE SOURCE: Department of Chemistry, Faculty of Engineering, Mie University, 514-8507, Japan
SOURCE: Electrochemistry (Tokyo) (2000), 68(10), 764-770
CODEN: EECTFA; ISSN: 1344-3542
PUBLISHER: Electrochemical Society of Japan
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The perovskite type oxides, Ln1-xAxO3-.delta. (Ln = lanthanides, A = Sr, Ca, M = Mn, **Co**), were studied as cathode materials in solid oxide fuel cells (SOFC) from a view point of compatibility with the solid electrolyte of **yttria** stabilized zirconia (8 **mol%** Y2O3 doped zirconia, 8YSZ). Generally, the pyrochlore, La2Zr2O7, can form at the boundary between the perovskite and 8YSZ. In the. . .
ST perovskite oxide cathode solid **fuel cell**; lanthanide strontium calcium manganese cobalt oxide; compatibility YSZ cathode **fuel cell**
IT **Fuel cell** cathodes
Overvoltage
Solid state fuel cells
Thermal expansion
(perovskite oxides for the cathode in solid oxide fuel cells)
AB The perovskite type oxides, Ln1-xAxO3-.delta. (Ln = lanthanides, A = Sr, Ca, M = Mn, **Co**), were studied as cathode materials in solid oxide fuel cells (SOFC) from a view point of compatibility with the solid electrolyte of **yttria** stabilized zirconia (8 **mol%** Y2O3 doped zirconia, 8YSZ). Generally, the pyrochlore, La2Zr2O7, can form at the boundary between the perovskite and 8YSZ. In the case of Ln1-xSrxMnO3-x (Ln =La, Pr, Nd, Sm, and Gd), the formation of the pyrochlore, Ln2Zr2O7, was suppressed for the perovskites having smaller lanthanoids than La, esp. for the Pr1-xSrxMnO3-.delta. and Nd1-xSrxMnO3-.delta. systems. The Ln1-xAxCoO3-.delta. systems with smaller lanthanoid ions were also effective in suppressing the reaction with 8YSZ. However, the Ln1-xAxCoO3-.delta. systems, which are promising cathode materials for a low operating temp. SOFC, have larger thermal expansion rates than 8YSZ. The formation of a solid soln. with Mn in the B-site of the perovskite such as Gd1-xAxMn1-yCoyO3-.delta. (A = Sr and Ca)

brought reasonable thermal expansion rates, compatible with 8YSZ and high oxygen redn. catalytic activity.
REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 6 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 2000:358455 CAPLUS
DOCUMENT NUMBER: 133:20027
TITLE: New cathode materials for solid oxide fuel cells ruthenium pyrochlores and perovskites
AUTHOR(S): Takeda, Takashi; Kanno, Ryoji; Kawamoto, Yoji; Takeda, Yasuo; Yamamoto, Osamu
CORPORATE SOURCE: Department of Chemistry, Faculty of Science, Kobe University, Hyogo, 657-8501, Japan
SOURCE: Journal of the Electrochemical Society (2000), 147(5), 1730-1733
CODEN: JESOAN; ISSN: 0013-4651
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The **ruthenium** pyrochlores, A2Ru2O7-.delta. (A = Pb, Bi), and **ruthenium** perovskites, ARuO3 (A = Ca, Sr) were characterized as new electrode materials for solid oxide fuel cells. The elec. cond., cathodic polarization, thermal expansion, and reactivity with **yttria**-stabilized zirconia were examd. The pyrochlores showed low cathodic overpotential even at 800.degree., metallic behavior with high elec. cond., and no reaction with **yttria**-stabilized zirconia at 900.degree.. The thermal expansion coeff. of the bismuth pyrochlore was comparable to **yttria**-stabilized (8 **mol**% Y2O3 content) zirconia. The pyrochlores are very attractive for application as cathode materials in a solid oxide **fuel cell** with low operating temp.

ST **fuel cell** cathode ruthenium pyrochlore perovskite; lead ruthenium pyrochlore perovskite **fuel cell** cathode; bismuth ruthenium pyrochlore perovskite **fuel cell** cathode

IT Cathodic polarization
Electric conductivity
Fuel cell cathodes
Solid state fuel cells
Thermal expansion
(cathode materials for solid oxide fuel cells ruthenium pyrochlores and perovskites)

AB The **ruthenium** pyrochlores, A2Ru2O7-.delta. (A = Pb, Bi), and **ruthenium** perovskites, ARuO3 (A = Ca, Sr) were characterized as new electrode materials for solid oxide fuel cells. The elec. cond., cathodic polarization, thermal expansion, and reactivity with **yttria**-stabilized zirconia were examd. The pyrochlores showed low cathodic overpotential even at 800.degree., metallic behavior with high elec. cond., and no reaction with **yttria**-stabilized zirconia at 900.degree.. The thermal expansion coeff. of the bismuth pyrochlore was comparable to **yttria**-stabilized (8 **mol**% Y2O3 content) zirconia. The pyrochlores are very attractive for application as cathode materials in a solid oxide **fuel cell** with low operating temp.

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 7 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 2000:24538 CAPLUS
DOCUMENT NUMBER: 132:197829
TITLE: Chemical compatibility of rare earth cobaltite perovskites with YSZ
AUTHOR(S): Tu, H. Y.; Lu, X. H.; Wen, T. L.; Takeda, Y.;

Ichikawa, T.; Imanishi, N.; Yamamoto, O.
CORPORATE SOURCE: Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, 200050, Peop. Rep. China
SOURCE: Journal of the Australasian Ceramic Society (1999), 35(1/2), 1-6
CODEN: JAUSEL; ISSN: 1018-6689
PUBLISHER: Australasian Ceramic Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB . . . chem. compatibility of perovskites in Ln1-xSrxCoO3-.delta.(Ln = Sm, Dy), Ln0.4Sr0.6Co0.8Fe0.2O3-.delta. (Ln = La, Pr, Nd, Sm, Gd), Gd0.8Ca0.2Co1-xMnxO3-.delta. with 8 **mol% yttria** stabilized zirconia(8YSZ) has been studied. Powder mixts. of these perovskites and 8YSZ have been annealed at different temps. for 96h. . . 8YSZ/Ln0.4Sr0.6Co0.8Fe0.2O3-.delta. (Ln = La,Pr,Nd,Sm,Gd) at 900.degree.. No reaction product has been detected in 8YSZ/Gd0.8Ca0.2Co1-xMnxO3-.delta. by XRD. However, significant diffusion of **Co** into 8YSZ has been found by EDX at the interface of 8YSZ/ Gd0.8Ca0.2Co0.6Mn0.4O3-.delta. after annealing at 1200.degree. for 24h. The. . .

ST chem compatibility rare earth cobaltite perovskite yttria zirconia; solid oxide **fuel cell** catalytic activity oxygen perovskite reaction; annealing interface bond valence model reaction perovskite yttria zirconia

AB Rare earth cobaltite perovskites are interesting cathode materials for the reduced temp. SOFC because of their high catalytic activity for O redn. The chem. compatibility of perovskites in Ln1-xSrxCoO3-.delta.(Ln = Sm, Dy), Ln0.4Sr0.6Co0.8Fe0.2O3-.delta. (Ln = La, Pr, Nd, Sm, Gd), Gd0.8Ca0.2Co1-xMnxO3-.delta. with 8 **mol% yttria** stabilized zirconia(8YSZ) has been studied. Powder mixts. of these perovskites and 8YSZ have been annealed at different temps. for 96h in air. As the main reaction product, SrZrO3 has been found in 8YSZ/Ln1-xSrxCoO3-.delta.(Ln = Sm,Dy) with high Sr content and 8YSZ/Ln0.4Sr0.6Co0.8Fe0.2O3-.delta. (Ln = La,Pr,Nd,Sm,Gd) at 900.degree.. No reaction product has been detected in 8YSZ/Gd0.8Ca0.2Co1-xMnxO3-.delta. by XRD. However, significant diffusion of **Co** into 8YSZ has been found by EDX at the interface of 8YSZ/ Gd0.8Ca0.2Co0.6Mn0.4O3-.delta. after annealing at 1200.degree. for 24h. The bond-valence model has been used to discuss the chem. compatibility of the different perovskites with 8YSZ.

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 8 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1999:511767 CAPLUS
DOCUMENT NUMBER: 131:146867
TITLE: Gd1-xAxCo1-yMnyO3 (A = Sr, Ca) as a cathode for the SOFC
AUTHOR(S): Phillipps, M. B.; Sammes, N. M.; Yamamoto, O.
CORPORATE SOURCE: Department of Technology, The University of Waikato, Hamilton, N. Z.
SOURCE: Solid State Ionics (1999), 123(1-4), 131-138
CODEN: SSIOD3; ISSN: 0167-2738
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The Gd1-xAxCo1-yMnyO3 (A = Sr, Ca) system was examd. as an electrode for use in a solid oxide **fuel cell**. Particular compns. displayed reasonable performances of elec. cond. and cathodic polarization (using an 8 **mol% yttria**-stabilized zirconia (YSZ) electrolyte system). Mn rich compns. showed thermal expansion compatibility with the YSZ electrolyte. Reactivity with YSZ revealed only. . . temps. allowing dissoln. of the unstable pyrochlore, into the YSZ lattice. SrZrO3 formation was noted at lower temps. for high **Co**-contg. compns., with reaction occurring at higher temps. for

compns. contg. even less **Co**.
ST solid oxide **fuel cell** cathode; gadolinium strontium calcium cobalt manganese oxide
IT Cathodic polarization
Electric conductivity
Fuel cell cathodes
Thermal expansion
(Gd1-xAxCo1-yMnyO3 (A = Sr, Ca) as a cathode for the solid oxide fuel cells)
AB The Gd1-xAxCo1-yMnyO3 (A = Sr, Ca) system was examd. as an electrode for use in a solid oxide **fuel cell**. Particular compns. displayed reasonable performances of elec. cond. and cathodic polarization (using an 8 **mol% yttria**-stabilized zirconia (YSZ) electrolyte system). Mn rich compns. showed thermal expansion compatibility with the YSZ electrolyte. Reactivity with YSZ revealed only small amts. of Gd2Zr2O7 formation resulting after annealing at 1000.degree.C, with higher annealing temps. allowing dissoln. of the unstable pyrochlore, into the YSZ lattice. SrZrO3 formation was noted at lower temps. for high **Co**-contg. compns., with reaction occurring at higher temps. for compns. contg. even less **Co**.
REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 9 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1999:404580 CAPLUS
DOCUMENT NUMBER: 131:104493
TITLE: Gd1-xAxMn1-yCoyO3-.delta. (A = Sr, Ca) as a cathode for solid-oxide fuel cells
AUTHOR(S): Tu, H. Y.; Phillipps, M. B.; Takeda, Y.; Ichikawa, T.; Imanishi, N.; Sammes, N. M.; Yamamoto, O.
CORPORATE SOURCE: Department of Chemistry, Faculty of Engineering, Mie University, Mie, 514-8507, Japan
SOURCE: Journal of the Electrochemical Society (1999), 146(6), 2085-2091
CODEN: JESOAN; ISSN: 0013-4651
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB . . . examd. as a cathode for use in solid oxide fuel cells. The elec. cond. and cathodic polarization on an 8 **mol% yttria**-stabilized zirconia (8YSZ) electrolyte had acceptable values for certain compns. Thermal expansion measurements were taken, showing compatibility of Mn-rich compns. with the 8YSZ electrolyte. Reactivity with 8YSZ revealed the formation of SrZrO3 or CaZrO3 at lower temps. for high **Co** contg. compns. No reaction product was detected between Gd0.8Ca0.2Mn1-yCoyO3-.delta. and 8YSZ. However, significant diffusion of **Co** into 8YSZ was found at the Gd0.8Ca0.2Mn0.4Co0.6O3-.delta./8YSZ interface after annealing at 1200.degree. for 24 h.
ST cathode solid oxide **fuel cell**; gadolinium strontium manganese cobalt oxide cathode; calcium gadolinium manganese cobalt oxide cathode
IT Cathodic polarization
Electric conductivity
Fuel cell cathodes
Thermal expansion
(Gd1-xAxMn1-yCoyO3-.delta. (A = Sr, Ca) as a cathode for solid-oxide fuel cells)
AB The Gd1-xAxMn1-yCoyO3-.delta. (A = Sr,Ca) systems were examd. as a cathode for use in solid oxide fuel cells. The elec. cond. and cathodic polarization on an 8 **mol% yttria**-stabilized zirconia (8YSZ) electrolyte had acceptable values for certain compns. Thermal expansion measurements were taken, showing compatibility of Mn-rich compns. with the 8YSZ electrolyte. Reactivity with 8YSZ revealed the formation of SrZrO3 or CaZrO3 at lower temps. for high **Co** contg.

compns. No reaction product was detected between Gd0.8Ca0.2Mn1-yCoyO3-.delta. and 8YSZ. However, significant diffusion of **Co** into 8YSZ was found at the Gd0.8Ca0.2Mn0.4Co0.6O3-.delta./8YSZ interface after annealing at 1200.degree. for 24 h.

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 10 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1999:342876 CAPLUS

DOCUMENT NUMBER: 131:61097

TITLE: Cathodic activity and interfacial stability of Y0.8Ca0.2Co1-xFexO3/YSZ electrodes for solid oxide fuel cells

AUTHOR(S): Lee, Hee Y.; Jang, Jong H.; Oh, Seung M.

CORPORATE SOURCE: Division of Chemical Engineering and Institute of Chemical Process, College of Engineering, Seoul National University, Seoul, 151-742, S. Korea

SOURCE: Journal of the Electrochemical Society (1999), 146(5), 1707-1711

CODEN: JESOAN; ISSN: 0013-4651

PUBLISHER: Electrochemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The Fe-doped cobaltates, Y0.8Ca0.2Co1-xFexO3-.delta. (x = 0.1-0.7), were prepd. and their high-temp. phase stability and cathodic activity were investigated. The perovskite/**yttria**-stabilized zirconia (YSZ) electrodes were fabricated via a silk printing technique. It was found that the undoped cobaltate (x = 0) is so thermally unstable that the prepn. of pure perovskite phase was unsuccessful. The partial Fe-doping to **Co** (x = 0.1-0.7), however, gave us highly cryst. perovskite powders of an orthorhombic lattice. Among those samples of x =. . . The thermal expansion coeff. of this material (10.5 .times. 10-6 cm/cm-K at 25-10000) was very close to that of 8 **mol%** YSZ (10.8 .times. 10-6 cm/cm-K). As a result of interfacial reaction between Y0.8Ca0.2Co0.7Fe0.3O3-.delta. and YSZ electrolyte, a spinel-type oxide was. . .

ST **fuel cell** interfacial stability cathode electrolyte

IT **Fuel cell** cathodes
  Fuel cell electrolytes
 Solid state fuel cells
 Thermal expansion
  (cathodic activity and interfacial stability of Y0.8Ca0.2Co1-xFexO3/yttria-stabilized ZrO2 electrodes for solid oxide fuel cells)

AB The Fe-doped cobaltates, Y0.8Ca0.2Co1-xFexO3-.delta. (x = 0.1-0.7), were prepd. and their high-temp. phase stability and cathodic activity were investigated. The perovskite/**yttria**-stabilized zirconia (YSZ) electrodes were fabricated via a silk printing technique. It was found that the undoped cobaltate (x = 0) is so thermally unstable that the prepn. of pure perovskite phase was unsuccessful. The partial Fe-doping to **Co** (x = 0.1-0.7), however, gave us highly cryst. perovskite powders of an orthorhombic lattice. Among those samples of x = 0.1-0.7, the Y0.8Ca0.2Co0.7Fe0.3O3-8 showed the best cathodic activity which is superior to La0.9Sr0.1MnO3. The thermal expansion coeff. of this material (10.5 .times. 10-6 cm/cm-K at 25-10000) was very close to that of 8 **mol%** YSZ (10.8 .times. 10-6 cm/cm-K). As a result of interfacial reaction between Y0.8Ca0.2Co0.7Fe0.3O3-.delta. and YSZ electrolyte, a spinel-type oxide was produced. But the interfacial product formation proceeded mainly during the electrode adhesion period (1200.degree.) whereas its growth during the cell operation (900-1000.degree.) was negligible.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 11 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:283914 CAPLUS
DOCUMENT NUMBER: 128:324019
TITLE: Redox-active impurity ions in solid electrolytes and their influence on transport properties
AUTHOR(S): Sasaki, K.; Murugaraj, P.; Haseidl, M.; Maier, J.
CORPORATE SOURCE: Max-Planck-Institut fur Festkorperforschung, Stuttgart, D-70569, Germany
SOURCE: Proceedings - Electrochemical Society (1997), 97-40(Solid Oxide Fuel Cells), 1190-1202
CODEN: PESODO; ISSN: 0161-6374
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB . . . discussed. As long as the content of these impurities is negligible with respect to the aliovalent oxide content (e.g., the **yttria** concn. in stabilized-ZrO2), the equil. concns. of electrons and holes are not affected by the impurities. However, they may have. . . ions of variable charges. The valence state and its change of doped transition metal ions (Ti, V, Cr, Mn, Fe, **Co**, Ni, Cu) and selected rare earth ions (Ce, Pr, Gd) in 9.5 **mol**%Y2O3-stabilized ZrO2 single crystals as a model solid electrolyte are identified by ESR (EPR/ESR) and optical absorption spectroscopy (NIR, VIS, UV).. . .

ST solid electrolyte **fuel cell** redox impurity; yttria stabilized zirconia electrolyte impurity

IT ESR (electron spin resonance)
Fuel cell electrolytes
Solid state fuel cells
(redox-active impurity ions in solid electrolytes and their influence on transport properties)

AB The importance of redox-active impurities in solid electrolytes is discussed. As long as the content of these impurities is negligible with respect to the aliovalent oxide content (e.g., the **yttria** concn. in stabilized-ZrO2), the equil. concns. of electrons and holes are not affected by the impurities. However, they may have a considerable influence on the chem. diffusion of oxygen by the internal source/sink effects as well as on the electronic cond. directly under conditions where the interaction with the gas phase is frozen in. Defect chem. and transport equations for solid electrolytes are given including the ionization equil. reactions of ions of variable charges. The valence state and its change of doped transition metal ions (Ti, V, Cr, Mn, Fe, **Co**, Ni, Cu) and selected rare earth ions (Ce, Pr, Gd) in 9.5 **mol**%Y2O3-stabilized ZrO2 single crystals as a model solid electrolyte are identified by ESR (EPR/ESR) and optical absorption spectroscopy (NIR, VIS, UV). The single crystals, annealed at 800.degree. in a po2 range from 1.0 down to 10-20 bar, are used in this study. The redox-active impurity ions in the solid electrolyte are specified by both methods.

REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 12 OF 22 CAPLUS
ACCESSION NUMBER: 1998:283200 CAPLUS
DOCUMENT NUMBER: 128:324002
TITLE: Chemical compatibility of LaFeO3 based perovskites with yttria stabilized zirconia
AUTHOR(S): Kindermann, L.; Hilpert, K.
CORPORATE SOURCE: Institute for Materials in Energy Systems, Research Centre Julich, Julich, 52425, Germany
SOURCE: Proceedings - Electrochemical Society (1997), 97-40(Solid Oxide Fuel Cells), 773-782
CODEN: PESODO; ISSN: 0161-6374
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB . . . as cathode materials for advanced SOFC. Physicochem. compatibilities of 63 compns., (La0.6A0.4)zFe0.8M0.2O3-.delta. (A = Sr, Ca; M = Cr, Mn, **Co**, Ni; z = 0.9, 1.0) and (La1-xSrx)zFe1-yMnyO3-.delta. (x = 0-0.4; y = 0-1; z = 0.9, 0.95, 1.0), with the solid electrolyte zirconia-**yttria** (8 **mol%** Y2O3) were investigated. Powder mixts. of these perovskites were annealed at 1000.degree., 1100.degree. and 1400.degree. for time periods up to. . . of SrZrO3 whereas La2Zr2O7 was detected in powder mixts. with high La concn. Samples with Ca on A site and **Co** or Ni on B site showed the formation of a CaZrO3 phase while a garnet phase was obsd. with M. . .

ST **fuel cell** cathode iron lanthanum oxide; perovskite yttria zirconia cathode **fuel cell**

IT **Fuel cell** cathodes
Fuel cell electrolytes
Solid state fuel cells
(chem. compatibility of LaFeO3 based perovskites with yttria stabilized zirconia)

AB Perovskites on the basis of LaFeO3 are of interest as cathode materials for advanced SOFC. Physicochem. compatibilities of 63 compns., (La0.6A0.4)zFe0.8M0.2O3-.delta. (A = Sr, Ca; M = Cr, Mn, **Co**, Ni; z = 0.9, 1.0) and (La1-xSrx)zFe1-yMnyO3-.delta. (x = 0-0.4; y = 0-1; z = 0.9, 0.95, 1.0), with the solid electrolyte zirconia-**yttria** (8 **mol%** Y2O3) were investigated. Powder mixts. of these perovskites were annealed at 1000.degree., 1100.degree. and 1400.degree. for time periods up to 3600 h. After quenching, the samples were analyzed by XRD, SEM/EDX and TEM/EDX for identification of the reaction products. High Sr content on A site leads to the formation of SrZrO3 whereas La2Zr2O7 was detected in powder mixts. with high La concn. Samples with Ca on A site and **Co** or Ni on B site showed the formation of a CaZrO3 phase while a garnet phase was obsd. with M = Cr or Mn. In some cases also monoclinic zirconia was found. Some compns. showed no reaction products. They might be possible candidates for use as cathode materials in solid oxide fuel cells.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 13 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:283184 CAPLUS
DOCUMENT NUMBER: 128:310434
TITLE: Influence of sintering characteristics on component curvature of electrolyte-coated anode substrates
AUTHOR(S): Steinbrech, R. W.; Caron, A.; Blass, G.; Dias, F.
CORPORATE SOURCE: Forschungszentrum Julich GmbH, Institut fur Werkstoffe der Energietechnik, Julich, D-52425, Germany
SOURCE: Proceedings - Electrochemical Society (1997), 97-40(Solid Oxide Fuel Cells), 727-736
CODEN: PESODO; ISSN: 0161-6374
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB . . . for lower operation temp. Such electrolyte/anode components are fabricated by casting the electrolyte material onto pre-sintered porous anode substrates and **co**-firing the bi-layered component. Due to different temps. for the onset of sintering and different amts. of shrinkage between electrolyte and. . . the effect, specimen strips were prepd. which could be vertically suspended in a sintering furnace. The shape changes during the **co**-firing were monitored in situ using a high temp. telescope system with microscopic resoln. Expts. are presented for 8 **mol% yttria**-stabilized zirconia (8YSZ) electrolyte films on NiO-8YSZ anode composites during sintering at 1400.degree.. Strategies for obtaining flat electrolyte/anode components are discussed.

ST **fuel cell** electrolyte coated anode sintering

IT **Fuel cell** anodes
Fuel cell electrolytes
Sintering
Solid state fuel cells
(influence of sintering characteristics on component curvature of electrolyte-coated anode substrates)

AB Thin electrolyte films (10-20 .mu.m) on anode material supports are considered as an attractive design concept for solid oxide fuel cells (SOFC) for lower operation temp. Such electrolyte/anode components are fabricated by casting the electrolyte material onto pre-sintered porous anode substrates and **co**-firing the bi-layered component. Due to different temps. for the onset of sintering and different amts. of shrinkage between electrolyte and anode material, curvature of the component is almost unavoidable. To quantify the effect, specimen strips were prepd. which could be vertically suspended in a sintering furnace. The shape changes during the **co**-firing were monitored in situ using a high temp. telescope system with microscopic resoln. Expts. are presented for 8 **mol%** **yttria**-stabilized zirconia (8YSZ) electrolyte films on NiO-8YSZ anode composites during sintering at 1400.degree.. Strategies for obtaining flat electrolyte/anode components are discussed.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 14 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER:	1997:461272 CAPLUS
DOCUMENT NUMBER:	127:178747
TITLE:	Chemical compatibility of LaFeO3-base perovskite structures at the interface of the electrolyte of a solid oxide **fuel cell** (SOFC)
AUTHOR(S):	Kindermann, L.; Hilpert, K.; Nickel, H.
CORPORATE SOURCE:	Institut Werkstoffe Energietechnik, Forschungszentrum Julich G.m.b.H., Juelich, D-52425, Germany
SOURCE:	Berichte des Forschungszentrums Juelich (1997), Juel-3382, 1-129 pp. CODEN: FJBEE5; ISSN: 0366-0885
DOCUMENT TYPE:	Report
LANGUAGE:	German

TI Chemical compatibility of LaFeO3-base perovskite structures at the interface of the electrolyte of a solid oxide **fuel cell** (SOFC)

AB For reducing the operation temp. of a solid oxide **fuel cell** from 1000.degree. to 850.degree. the development of a new and advanced cathode material is a necessary demand. The investigation of. . . . oxygen vacancy formation were carried out. Physicochem. compatibilities of different compns., (La0.6A0.4)zFe0.8Mo.2O3 (A = Sr, Ca; M = Cr, Mn, **Co**, Ni; z = 0.9, 1.0) and (La1-xSrx)zFe1-yMnyO3 (x = 0-0.4; y = 0-1; z = 0.9, 0.95, 1.0), with the solid electrolyte zirconia-**yttria** (8 **mol%** Y2O3) were investigated. Powder mixts. of these perovskites were annealed at 1000.degree., 1100.degree. and 1400.degree. for time periods up to. . . . of SrZrO3 whereas La2Zr2O7 was detected in powder mixts. with high La concn. Samples with Ca on A site and **Co** or Ni on B site showed the formation of a CaZrO3 phase while a garnet phase was obsd. with M. . . . LaFeO3 based perovskites. Some suggestions were made concerning an electrolyte with a modified compn. as well as different dopants namely **Co**, Zr or Ir.

ST **fuel cell** cathode electrolyte chem compatibility; perovskite yttria zirconia electrolyte interface; lanthanum iron oxide **fuel cell** cathode; iridium doping perovskite **fuel cell** cathode

IT Ceramics
Electrode-electrolyte interface
Fuel cell cathodes
Fuel cell electrolytes

Perovskite-type crystals
(chem. compatibility of LaFeO3-base perovskite cathodes at interface of YSZ electrolyte of a solid oxide **fuel cell**)

IT Polarization resistance
Thermal expansion
(of LaFeO3-base perovskite **fuel cell** cathodes)

IT 12022-43-4, Iron lanthanum oxide (FeLaO3) 12031-12-8, Lanthanum manganese oxide (LaMnO3) 12186-38-8, Iron lanthanum manganese oxide (Fe0.5LaMn0.5O3) 108916-21-8, Lanthanum manganese strontium oxide (La0.6MnSr0.4O3) 108916-22-9, Lanthanum manganese strontium oxide (La0.8MnSr0.2O3) 109546-91-0, Iron lanthanum strontium oxide (FeLa0.8Sr0.2O3) 110641-92-4, Iron lanthanum manganese strontium oxide (Fe0.2La0.7Mn0.8Sr0.3O3) 110758-52-6, Iron lanthanum strontium oxide (FeLa0.6Sr0.4O3) 120949-38-4, Iron lanthanum manganese strontium oxide (Fe0.5La0.7Mn0.5Sr0.3O3) 133878-22-5, Lanthanum manganese strontium oxide (La0.66MnSr0.28O3) 148595-66-8, Cobalt iron lanthanum strontium oxide (Co0.2Fe0.8La0.6Sr0.4O3) 158307-83-6, Calcium iron lanthanum manganese oxide (Ca0.4Fe0.8La0.6Mn0.2O3) 158307-84-7, Iron lanthanum manganese strontium oxide (Fe0.8La0.6Mn0.2Sr0.4O3) 159423-43-5, Calcium cobalt iron lanthanum oxide (Ca0.4Co0.2Fe0.8La0.6O3) 164723-14-2, Iron lanthanum manganese strontium oxide (Fe0.2La0.8Mn0.8Sr0.2O3) 166188-05-2, Calcium iron lanthanum nickel oxide (Ca0.4Fe0.8La0.6Ni0.2O3) 166188-06-3, Calcium iron lanthanum nickel oxide (Ca0.36Fe0.8La0.54Ni0.2O3) 166188-07-4, Calcium chromium iron lanthanum oxide (Ca0.36Cr0.2Fe0.8La0.54O3) 166188-08-5, Calcium iron lanthanum manganese oxide (Ca0.36Fe0.8La0.54Mn0.2O3) 166188-09-6, Calcium cobalt iron lanthanum oxide (Ca0.36Co0.2Fe0.8La0.54O3) 177080-58-9, Iron lanthanum manganese strontium oxide (Fe0.5La0.6Mn0.5Sr0.4O3) 184045-31-6, Chromium iron lanthanum strontium oxide (Cr0.2Fe0.8La0.6Sr0.4O3) 184045-32-7, Iron lanthanum nickel strontium oxide (Fe0.8La0.6Ni0.2Sr0.4O3) 184045-33-8, Chromium iron lanthanum strontium oxide (Cr0.2Fe0.8La0.54Sr0.36O3) 184045-34-9, Iron lanthanum manganese strontium oxide (Fe0.8La0.54Mn0.2Sr0.36O3) 184045-35-0, Cobalt iron lanthanum strontium oxide (Co0.2Fe0.8La0.54Sr0.36O3) 184045-36-1, Iron lanthanum nickel strontium oxide (Fe0.8La0.54Ni0.2Sr0.36O3) 184839-68-7, Iron lanthanum manganese strontium oxide (Fe0.2La0.86Mn0.8Sr0.1O3) 184839-70-1, Iron lanthanum manganese strontium oxide (Fe0.5La0.86Mn0.5Sr0.1O3) 184839-72-3, Iron lanthanum manganese strontium oxide (Fe0.5La0.66Mn0.5Sr0.28O3) 185147-80-2, Iron lanthanum manganese strontium oxide (Fe0.7La0.7Mn0.3Sr0.3O3) 185147-81-3, Iron lanthanum manganese strontium oxide (Fe0.7La0.76Mn0.3Sr0.19O3) 185147-82-4, Iron lanthanum manganese strontium oxide (Fe0.5La0.72Mn0.5Sr0.18O3) 185147-83-5, Iron lanthanum manganese strontium oxide (Fe0.2La0.76Mn0.8Sr0.19O3) 185147-84-6, Iron lanthanum manganese oxide (Fe0.2La0.95Mn0.8O3) 185147-85-7, Iron lanthanum manganese strontium oxide (Fe0.7La0.86Mn0.3Sr0.1O3) 185147-86-8, Iron lanthanum manganese strontium oxide (Fe0.7La0.66Mn0.3Sr0.28O3) 185147-87-9, Iron lanthanum manganese strontium oxide (Fe0.2La0.66Mn0.8Sr0.28O3) 185147-88-0, Iron lanthanum manganese strontium oxide (Fe0.7La0.63Mn0.3Sr0.27O3) 185148-62-3, Iron lanthanum manganese strontium oxide (Fe0.8La0.72Mn0.2Sr0.18O3) 188425-10-7, Calcium chromium iron lanthanum oxide (Ca0.4Cr0.2Fe0.8La0.6O3) 190203-97-5, Iron lanthanum manganese strontium oxide (Fe0.5La0.63Mn0.5Sr0.27O3) 190203-98-6, Iron lanthanum manganese strontium oxide (Fe0.2La0.63Mn0.8Sr0.27O3) 190203-99-7, Iron lanthanum manganese strontium oxide (Fe0.2La0.81Mn0.8Sr0.14O3) 190204-00-3, Iron lanthanum manganese strontium oxide (Fe0.2La0.71Mn0.8Sr0.24O3) 190204-01-4, Iron lanthanum manganese strontium oxide (Fe0.5La0.76Mn0.5Sr0.14O3) 190204-02-5, Lanthanum manganese strontium oxide (La0.71MnSr0.24O3) 190204-03-6, Iron lanthanum manganese strontium oxide (Fe0.1La0.71Mn0.9Sr0.24O3) 191729-80-3, Cobalt iron lanthanum manganese strontium oxide (Co0.05Fe0.5La0.7Mn0.45Sr0.3O3) 193412-94-1 193412-95-2 193412-96-3 193412-97-4, Iron lanthanum manganese strontium oxide (Fe0.2La0.76Mn0.8Sr0.14O3) 193412-98-5 193412-99-6,

Iron lanthanum manganese strontium oxide ($Fe_{0.5}La_{0.76}Mn_{0.5}Sr_{0.19}O_3$)
193413-00-2 193413-01-3, Iron lanthanum manganese strontium oxide ($Fe_{0.2}La_{0.9}Mn_{0.8}Sr_{0.1}O_3$) 193413-02-4, Iron lanthanum manganese strontium oxide ($Fe_{0.5}La_{0.9}Mn_{0.5}Sr_{0.1}O_3$) 193413-03-5, Iron lanthanum manganese strontium oxide ($Fe_{0.5}La_{0.8}Mn_{0.5}Sr_{0.2}O_3$) 193413-04-6, Iron lanthanum manganese strontium oxide ($Fe_{0.7}La_{0.9}Mn_{0.3}Sr_{0.1}O_3$) 193413-05-7, Iron lanthanum manganese strontium oxide ($Fe_{0.7}La_{0.8}Mn_{0.3}Sr_{0.2}O_3$)
193413-06-8, Iron lanthanum manganese strontium oxide ($Fe_{0.2}La_{0.81}Mn_{0.8}Sr_{0.09}O_3$) 193413-07-9, Iron lanthanum manganese strontium oxide ($Fe_{0.5}La_{0.81}Mn_{0.5}Sr_{0.09}O_3$) 193413-08-0, Iron lanthanum manganese strontium oxide ($Fe_{0.7}La_{0.81}Mn_{0.3}Sr_{0.09}O_3$) 193413-09-1, Iron lanthanum manganese strontium oxide ($Fe_{0.7}La_{0.72}Mn_{0.3}Sr_{0.18}O_3$)
193413-10-4 193413-11-5 193413-12-6
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(chem. compatibility of $LaFeO_3$-base perovskite cathodes at interface of YSZ electrolyte of a solid oxide **fuel cell**)

IT 7439-88-5, Iridium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(chem. compatibility of $LaFeO_3$-base perovskite cathodes at interface of YSZ electrolyte of a solid oxide **fuel cell**)

IT 64417-98-7, Yttrium zirconium oxide
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(chem. compatibility of $LaFeO_3$-base perovskite cathodes at interface of YSZ electrolyte of a solid oxide **fuel cell**)

IT 1314-23-4, Zirconia, uses
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(yttria-stabilized; chem. compatibility of $LaFeO_3$-base perovskite cathodes at interface of YSZ electrolyte of a solid oxide **fuel cell**)

IT 1314-36-9, Yttria, uses
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(zirconia contg.; chem. compatibility of $LaFeO_3$-base perovskite cathodes at interface of YSZ electrolyte of a solid oxide **fuel cell**)

AB For reducing the operation temp. of a solid oxide **fuel cell** from 1000.degree. to 850.degree. the development of a new and advanced cathode material is a necessary demand. The investigation of the chem. stability and compatibility of a new material based on $LaFeO_3$ was of main interest in the work. In addn. the elec. properties and the thermal expansion coeff. of some selected compns. were investigated. Also expts. to det. the oxygen vacancy formation were carried out. Physicochem. compatibilities of different compns., $(La_{0.6}A_{0.4})_zFe_{0.8}M_{0.2}O_3$ (A = Sr, Ca; M = Cr, Mn, **Co**, Ni; z = 0.9, 1.0) and $(La_{1-x}Sr_x)_zFe_{1-y}Mn_yO_3$ (x = 0-0.4; y = 0-1; z = 0.9, 0.95, 1.0), with the solid electrolyte zirconia-**yttria** (8 **mol%** Y_2O_3) were investigated. Powder mixts. of these perovskites were annealed at 1000.degree., 1100.degree. and 1400.degree. for time periods up to 3600 h in a high temp. furnace. After quenching, the samples were analyzed by XRD, SEM/EDX and TEM/EDX for identification of the reaction products. Inter-diffusion processes between the perovskite material and the electrolyte lead to the formation of new phases. High Sr content on A site lead to the formation of $SrZrO_3$ whereas $La_2Zr_2O_7$ was detected in powder mixts. with high La concn. Samples with Ca on A site and **Co** or Ni on B site showed the formation of a $CaZrO_3$ phase while a garnet phase was obsd. with M = Cr or Mn. In some cases also monoclinic zirconia was found. Some compns. showed no reaction products. Based on these results it was possible to work out different stability criteria for $LaFeO_3$ based perovskites. Some suggestions were made concerning an electrolyte with a modified compn. as well as different dopants namely **Co**, Zr or Ir.

L1 ANSWER 15 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1997:355784 CAPLUS
DOCUMENT NUMBER: 127:68419
TITLE: Sputtered La0.5Sr0.5MnO3-yttria stabilized zirconia composite film electrodes for SOFC
AUTHOR(S): Hayashi, Koichiro; Yamamoto, Osamu; Nishigaki, Yasuhiro; Minoura, Hideki
CORPORATE SOURCE: Gifu Prefectural Industrial Research Technical Center, 47 Kitaoyobi, Kasamatu, Hashima, Gifu, Japan
SOURCE: Solid State Ionics (1997), 98(1,2), 49-55
CODEN: SSIOD3; ISSN: 0167-2738
PUBLISHER: Elsevier
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The La0.5Sr0.5MnO3 (SLM)-8 **mol %yttria** stabilized cubic zirconia (YSZ) composite film electrodes were prepd. by **co** -sputtering SLM and YSZ under an argon and oxygen mixed atm. The elec. cond. and cathodic overpotential of these composite films were examd. The cathodic overpotential of SLM was decreased by **co**-sputtering SLM and YSZ. The addn. of YSZ to SLM diminished the grain growth of SLM by annealing at a high. . .

ST sputtered composite film cathode **fuel cell**; YSZ lanthanum strontium manganese oxide cathode; elec cond cathodic overpotential **fuel cell**

IT Annealing
Electric conductivity
Fuel cell cathodes
Overvoltage
Reactive sputtering
(sputtered La0.5Sr0.5MnO3-yttria stabilized zirconia composite film cathodes for solid oxide fuel cells)

AB The La0.5Sr0.5MnO3 (SLM)-8 **mol %yttria** stabilized cubic zirconia (YSZ) composite film electrodes were prepd. by **co** -sputtering SLM and YSZ under an argon and oxygen mixed atm. The elec. cond. and cathodic overpotential of these composite films were examd. The cathodic overpotential of SLM was decreased by **co**-sputtering SLM and YSZ. The addn. of YSZ to SLM diminished the grain growth of SLM by annealing at a high temp.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 16 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1997:173475 CAPLUS
DOCUMENT NUMBER: 126:240640
TITLE: Chemical compatibility of (La0.6Ca0.4)xFe0.8M0.2O3 with yttria-stabilized zirconia
AUTHOR(S): Kindermann, L.; Das, D.; Nickel, H.; Hilpert, K.; Appel, C. C.; Poulson, F. W.
CORPORATE SOURCE: Inst. Materials Energyy Systems, Res. Centre Julich, Julich, Germany
SOURCE: Journal of the Electrochemical Society (1997), 144(2), 717-720
CODEN: JESOAN; ISSN: 0013-4651
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB . . . significantly lower than 900.degree.. The compatibility of the selected materials is necessary to guarantee long-term operation of a solid oxide **fuel cell**. Systematic investigations on the reactivity between the solid electrolyte **yttria**-stabilized zirconia (ZrO2 + 8 **mol** percent Y2O3) and the perovskites (La0.6Ca0.4)xFe0.8M0.2O3 (x=1, 0.9; M=Cr, Mn, **Co**, Ni) were carried out. The results obtained are discussed.

ST **fuel cell** cathode lanthanum iron oxide; yttria

zirconia compatibility **fuel cell** cathode
IT **Fuel cell** cathodes
(chem. compatibility of (La0.6Ca0.4)xFe0.8M0.2O3 with yttria-stabilized zirconia)
AB LaFeO3-based perovskites are of interest as cathode material for the development of advanced solid oxide fuel cells operating at temps. significantly lower than 900.degree.. The compatibility of the selected materials is necessary to guarantee long-term operation of a solid oxide **fuel cell**. Systematic investigations on the reactivity between the solid electrolyte **yttria**-stabilized zirconia (ZrO2 + 8 **mol** percent Y2O3) and the perovskites (La0.6Ca0.4)xFe0.8M0.2O3 (x=1, 0.9; M=Cr, Mn, **Co**, Ni) were carried out. The results obtained are discussed.

L1 ANSWER 17 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1996:678411 CAPLUS
DOCUMENT NUMBER: 126:34269
TITLE: Catalysis of the electrochemical processes on solid oxide **fuel cell** cathodes
AUTHOR(S): Erning, J. W.; Hauber, T.; Stimming, U.; Wippermann, K.
CORPORATE SOURCE: Institute of Energy Process Engineering (IEV), Forschungszentrum Juelich GmbH (KFA), PO Box 1913, 52425, Julich, Germany
SOURCE: Journal of Power Sources (1996), 61(1-2), 205-211 CODEN: JPSODZ; ISSN: 0378-7753
PUBLISHER: Elsevier
DOCUMENT TYPE: Journal
LANGUAGE: English
TI Catalysis of the electrochemical processes on solid oxide **fuel cell** cathodes
AB Three methods of lowering the activation energy of the oxygen redn. reaction at solid oxide **fuel cell** (SOFC) cathodes are reported: (i) addn. of highly dispersed noble metals (.ltoreq.0.1 mg/cm2) at the La0.84Sr0.16MnO3 cathode/**yttria** stabilized zirconia (YSZ) electrolyte interface; (ii) partial substitution of manganese by **cobalt** in La0.79Sr0.16MnO3 cathodes, and (iii) combination of (i) and (ii). In the presence of palladium, the apparent activation energy, Ea,. . . from 2.2 eV (La0.84Sr0.16MnO3 without catalyst) to 1.4 eV. A similar effect is obsd., when manganese is substituted by 20 **mol** % **Co** (La0.79Sr0.16Mn0.80Co0.20O3), where Ea.apprxeq.0.9 eV is obtained. In the presence of palladium, with the substitution of manganese by **cobalt** (method (iii)), no further improvement is achieved.
ST solid oxide **fuel cell** cathode catalysis
IT **Fuel cell** cathodes
Reduction, electrochemical
(catalysis of the electrochem. processes on solid oxide **fuel cell** cathodes)
IT Reduction catalysts
(electrochem.; catalysis of the electrochem. processes on solid oxide **fuel cell** cathodes)
IT 1314-23-4, Zirconia, uses
RL: DEV (Device component use); USES (Uses)
(Y2O3-stabilized, electrolyte; catalysis of the electrochem. processes on solid oxide **fuel cell** cathodes)
IT 1314-36-9, Yttria, uses
RL: DEV (Device component use); USES (Uses)
(ZrO2 stabilized with, electrolyte; catalysis of the electrochem. processes on solid oxide **fuel cell** cathodes)
IT 7439-88-5, Iridium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); USES (Uses)
(catalysis of the electrochem. processes on solid oxide **fuel**

cell cathodes)

IT 140884-85-1, Lanthanum manganese strontium oxide La0.84MnSr0.16O3 162191-00-6, Cobalt Lanthanum manganese strontium oxide Co0.2La0.79Mn0.8Sr0.16O3 164913-46-6, Cobalt Lanthanum manganese strontium oxide Co0.1La0.79Mn0.9Sr0.16O3 184844-08-4, Lanthanum manganese strontium oxide (La0.79MnSr0.16O3)
RL: DEV (Device component use); USES (Uses)
(catalysis of the electrochem. processes on solid oxide **fuel cell** cathodes)

IT 114168-16-0, Yttrium zirconium oxide (Y0.16Zr0.92O2.08)
RL: DEV (Device component use); USES (Uses)
(electrolyte; catalysis of the electrochem. processes on solid oxide **fuel cell** cathodes)

IT 7782-44-7, Oxygen, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(redn.; catalysis of the electrochem. processes on solid oxide **fuel cell** cathodes)

AB Three methods of lowering the activation energy of the oxygen redn. reaction at solid oxide **fuel cell** (SOFC) cathodes are reported: (i) addn. of highly dispersed noble metals (.ltoreq.0.1 mg/cm2) at the La0.84Sr0.16MnO3 cathode/**yttria** stabilized zirconia (YSZ) electrolyte interface; (ii) partial substitution of manganese by **cobalt** in La0.79Sr0.16MnO3 cathodes, and (iii) combination of (i) and (ii). In the presence of palladium, the apparent activation energy, Ea, of the oxygen redn. reaction is decreased from 2.2 eV (La0.84Sr0.16MnO3 without catalyst) to 1.4 eV. A similar effect is obsd., when manganese is substituted by 20 **mol% Co** (La0.79Sr0.16Mn0.80Co0.20O3), where Ea.apprxeq.0.9 eV is obtained. In the presence of palladium, with the substitution of manganese by **cobalt** (method (iii)), no further improvement is achieved.

L1 ANSWER 18 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1996:663911 CAPLUS
DOCUMENT NUMBER: 126:9956
TITLE: Chemical compatibility of the LaFeO3 base perovskites (La0.6Sr0.4)zFe0.8M0.2O3-.delta. (z = 1, 0.9; M = Cr, Mn, Co, Ni) with yttria stabilized zirconia
AUTHOR(S): Kindermann, L.; Das, D.; Nickel, H.; Hilpert, K.
CORPORATE SOURCE: Institute for Materials in Energy Systems Research Centre Juelich (KFA), Julich, 52425, Germany
SOURCE: Solid State Ionics (1996), 89(3,4), 215-220
CODEN: SSIOD3; ISSN: 0167-2738
PUBLISHER: Elsevier
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Physicochem. compatibilities of the series of LaFeO3 base perovskites La0.6Sr0.4Fe0.8M0.2O3-.delta. and (La0.6Sr0.4)0.9Fe0.8M0.2O3-.delta. (M = Cr, Mn, **Co**, Ni) with solid electrolyte **yttria** -stabilized (8 **mol%** Y2O3) cubic zirconia (8YSZ) were investigated. Powder mixts. of the perovskites with 8YSZ were annealed at 1000.degree.C for time periods. . .

ST **fuel cell** solid oxide cathode; perovskite lanthanum ferrite yttria zirconia cathode

IT **Fuel cell** cathodes
(chem. compatibility of the LaFeO3-based perovskites as cathode material for fuel cells)

AB Physicochem. compatibilities of the series of LaFeO3 base perovskites La0.6Sr0.4Fe0.8M0.2O3-.delta. and (La0.6Sr0.4)0.9Fe0.8M0.2O3-.delta. (M = Cr, Mn, **Co**, Ni) with solid electrolyte **yttria** -stabilized (8 **mol%** Y2O3) cubic zirconia (8YSZ) were investigated. Powder mixts. of the perovskites with 8YSZ were annealed at 1000.degree.C for time periods up to 1300 h. The quenched samples were analyzed by XRD and SEM/EDX for identifying the reaction products. The results provide a working hypothesis for the development of improved

compns. of cathode materials in solid oxide fuel cells.

L1 ANSWER 19 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1996:608740 CAPLUS
DOCUMENT NUMBER: 125:259580
TITLE: Sputtered Ni-yttria stabilized zirconia composite film electrodes for SOFC
AUTHOR(S): Hayashi, Koichiro; Yamamoto, Osamu; Nishigaki, Yasuhiro; Minoura, Hideki
CORPORATE SOURCE: Gifu Prefectural Indus. Res. Technical Cent., Gifu, 501-61, Japan
SOURCE: Denki Kagaku oyobi Kogyo Butsuri Kagaku (1996), 64(10), 1097-1101
CODEN: DKOKAZ; ISSN: 0366-9297
PUBLISHER: Denki Kagaku Kyokai
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Nickel oxide and 8 **mol** % **yttria** stabilized cubic zirconia (YSZ) composite films were **co**-deposited on Al2O3 and YSZ substrates with a reactive sputtering technique in argon and oxygen atm. using Ni and YSZ targets and reduced in a gas flow of 96%N2-4%H2 at 1000.degree. for 3 h. The **co**-sputtering of YSZ and Ni suppressed the growth of Ni grains and decreased the anodic overvoltage for hydrogen oxidn. The composite. . .

ST sputtered nickel yttria stabilized zirconia electrode; solid oxide **fuel cell** composite electrode; anodic overvoltage hydrogen oxidn composite electrode

IT Electrodes
(**fuel-cell**, nickel oxide and yttria stabilized cubic zirconia composite films codeposited on Al2O3 and YSZ substrates by reactive sputtering technique and reduced for composite film)

IT 64417-98-7, Yttrium zirconium oxide
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(nickel oxide and yttria stabilized cubic zirconia composite films codeposited on Al2O3 and YSZ substrates by reactive sputtering technique and reduced in 96%N2-4%H2 for composite film electrodes for solid oxide **fuel cell**)

IT 1313-99-1, Nickel oxide nio, uses 1344-28-1, Alumina, uses 114168-16-0, Yttrium zirconium oxide y0.16zr0.92o2.08
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(nickel oxide and yttria stabilized cubic zirconia composite films codeposited on Al2O3 and YSZ substrates by reactive sputtering technique and reduced in gas flow of 96%N2-4%H2 for composite film electrodes for solid oxide **fuel cell**)

IT 1314-23-4, Zirconia, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(yttria-stabilized; nickel oxide and yttria stabilized cubic zirconia composite films codeposited on Al2O3 and YSZ substrates by reactive sputtering technique and reduced in 96%N2-4%H2 for composite film electrodes for solid oxide **fuel cell**)

IT 1314-36-9, Yttria, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(zirconia stabilized by; nickel oxide and yttria stabilized cubic zirconia composite films codeposited on Al2O3 and YSZ by reactive sputtering technique and reduced in 96%N2-4%H2 for composite film electrodes for solid oxide **fuel cell**)

AB Nickel oxide and 8 **mol** % **yttria** stabilized cubic zirconia (YSZ) composite films were **co**-deposited on Al2O3 and YSZ substrates with a reactive sputtering technique in argon and oxygen atm. using Ni and YSZ targets and reduced in a gas flow of 96%N2-4%H2 at 1000.degree. for 3 h. The **co**-sputtering of YSZ and Ni suppressed the growth of Ni grains and decreased the anodic overvoltage for hydrogen oxidn. The composite anode is esp. attractive as the SOFC operating at lower temps., e.g., 800.degree..

L1 ANSWER 20 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1993:499844 CAPLUS
DOCUMENT NUMBER: 119:99844
TITLE: High power density solid oxide electrolyte fuel cells using ruthenium/yttria-stabilized zirconia cermet anodes
AUTHOR(S): Suzuki, Minoru; Sasaki, Hirokazu; Otoshi, Shoji; Kajimura, Atsuko; Ippommatsu, Masamichi
CORPORATE SOURCE: Fundam. Res. Lab., Osaka Gas Co., Ltd., Osaka, 554, Japan
SOURCE: Solid State Ionics (1993), 62(1-2), 125-30
CODEN: SSIOD3; ISSN: 0167-2738
DOCUMENT TYPE: Journal
LANGUAGE: English

AB **Ru**/YSZ cermet SOFC (solid oxide electrolyte fuel cells) anodes were fabricated by the EVD method. **Ru** has high sintering resistivity compared with Ni. During a power generation tests at 1273 K the **Ru**/YSZ (**Ru/yttria** stabilized zirconia) cermet anode showed high activity for hydrogen oxidn. compared with conventional Ni/YSZ cermet anodes. Esp. at a high. . . a.c. polarization value was reduced to approx. 200 mV. Tubular type SOFCs were made by depositing 10 .mu.m thick 10 **mol.**% YSZ electrolyte films on porous La(Sr)MnOx cathode tubes using the EVD process and then making a **Ru**/YSZ cermet anode on YSZ. The cells had the highest power generatioon d., with a max. d. of 1550 mW/cm2. After. . . of approx. one week including several thermal cycles, the anode polarization was unchanged and there was no change in the **Ru** metal grain size.

ST **fuel cell** solid oxide anode; ruthenium yttria stabilized zirconia anode; cermet **fuel cell** anode

IT Anodes
(**fuel-cell**, ruthenium-yttria-stabilized zirconia, for high-power-d. solid oxide electrolyte cells)

AB **Ru**/YSZ cermet SOFC (solid oxide electrolyte fuel cells) anodes were fabricated by the EVD method. **Ru** has high sintering resistivity compared with Ni. During a power generation tests at 1273 K the **Ru**/YSZ (**Ru/yttria** stabilized zirconia) cermet anode showed high activity for hydrogen oxidn. compared with conventional Ni/YSZ cermet anodes. Esp. at a high c.d. of a max. of 3200 mA/cm2 the a.c. polarization value was reduced to approx. 200 mV. Tubular type SOFCs were made by depositing 10 .mu.m thick 10 **mol.**% YSZ electrolyte films on porous La(Sr)MnOx cathode tubes using the EVD process and then making a **Ru**/YSZ cermet anode on YSZ. The cells had the highest power generatioon d., with a max. d. of 1550 mW/cm2. After the power generation test of approx. one week including several thermal cycles, the anode polarization was unchanged and there was no change in the **Ru** metal grain size.

L1 ANSWER 21 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1990:182933 CAPLUS
DOCUMENT NUMBER: 112:182933
TITLE: Reforming catalysts for fuel cells
INVENTOR(S): Mushiai, Akira; Ishizaki, Fumiya; Segawa, Tomoko
PATENT ASSIGNEE(S): Toa Nenryo Kogyo K. K., Japan; Zaidan Hojin Sekiyu Sangyo Kaseika Center
SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

JP 02002878 A2 19900108 JP 1988-220494 19880905
PRIORITY APPLN. INFO.: JP 1988-57371 19880312

AB Internal-reforming **fuel-cell** catalysts are Rh, **Ru**, Pd, or their alloys loaded on tetragonal or cubic Y2O3-contg. ZrO2 carriers. These catalysts have high efficiency of H prodn. and low C deposition. Thus, zirconia contg. 3 **mol% yttria** was pulverized, immersed in Rh chloride soln., and dried to obtain a catalyst contg. 0.5wt.% Rh.

ST internal reforming catalyst **fuel cell**; yttria stabilized zirconia catalyst carrier; rhodium reforming catalyst **fuel cell**; ruthenium reforming catalyst **fuel cell**; palladium reforming catalyst **fuel cell**

AB Internal-reforming **fuel-cell** catalysts are Rh, **Ru**, Pd, or their alloys loaded on tetragonal or cubic Y2O3-contg. ZrO2 carriers. These catalysts have high efficiency of H prodn. and low C deposition. Thus, zirconia contg. 3 **mol% yttria** was pulverized, immersed in Rh chloride soln., and dried to obtain a catalyst contg. 0.5wt.% Rh.

L1 ANSWER 22 OF 22 CAPLUS

ACCESSION NUMBER: 1990:122139 CAPLUS
DOCUMENT NUMBER: 112:122139
TITLE: Solid-state reaction of lanthanum **cobalt** nickel oxide [La(Co1-xNix)O3] with 10 **mol% yttria**-zirconia
AUTHOR(S): Echigoya, J.; Hiratsuka, S.; Suto, H.
CORPORATE SOURCE: Fac. Eng., Tohoku Univ., Sendai, 980, Japan
SOURCE: Materials Transactions, JIM (1989), 30(10), 789-99
CODEN: MTJIEY; ISSN: 0916-1821
DOCUMENT TYPE: Journal
LANGUAGE: English

TI Solid-state reaction of lanthanum **cobalt** nickel oxide [La(Co1-xNix)O3] with 10 **mol% yttria**-zirconia

ST **fuel cell** electrode material reaction; electrolyte electrode reaction **fuel cell**; lanthanum cobalt nickel oxide electrode; yttria zirconia electrolyte **fuel cell**

IT Crystal structure
(of cobalt lanthanum nickel oxides, for **fuel cell** electrodes)

IT Electric resistance
(of cobalt lanthanum nickel oxides, for **fuel cell** electrodes, yttria-zirconia electrolyte bonding in relation to)

IT Electrodes
(**fuel-cell**, lanthanum cobalt nickel oxide for, yttria-stabilized zirconia interaction with)

IT Expansion, Dilation, and Elongation
(thermal, of cobalt lanthanum nickel oxides, for **fuel cell** electrodes, yttria-zirconia electrolyte bonding in relation to)

IT 12016-86-3, Cobalt lanthanum oxide (CoLaO3) 12031-18-4, Lanthanum nickel oxide (LaNiO3) 80302-08-5, Cobalt lanthanum nickel oxide (Co0.5LaNi0.5O3) 114168-25-1, Cobalt lanthanum nickel oxide (Co0.6LaNi0.4O3) 117058-53-4, Cobalt lanthanum nickel oxide (Co0.4LaNi0.6O3) 123517-02-2, Cobalt lanthanum nickel oxide (Co0.2LaNi0.8O3) 125862-38-6, Cobalt lanthanum nickel oxide (Co0.8LaNi0.2O3)
RL: PRP (Properties)
(crystal structure and thermal expansion and elec. resistance of, temp. effect on, for **fuel cell** electrodes)

AB The reaction of cubic ZrO3 with La(Co1-xNix)O3 was investigated during hot pressing at 1573 K, for manuf. of electrodes for high temp. fuel cells. The reaction occurred for all x values. The compns. of the reacted areas were estd. as La2Zr2O7, La2Zr(NI0.6Co0.4)O6, and La2ZrNiO6 for x = 0, 0.4, and 1, resp. The width of the reacted area decreased with increasing Ni

fraction. Sintering of samples with compns. of the reacted areas was carried out to investigate the crystal structure, elec. resistivity, and thermal expansion coeff. of the reacted compds. The thermal expansion coeffs. of the reacted compds. were always intermediate between those of cubic ZrO2 and La(Co1-xNix)O3. The elec. resistivity of La2Zr2O7 was in the order of 103 .OMEGA.-m even at 1273 K. The substitution of Ni or Co for the Zr site caused a decrease in the elec. resistivity which became .apprx.10-1 .OMEGA.-m at 1273 K. Electrode materials of cubic ZrO2 are also described.